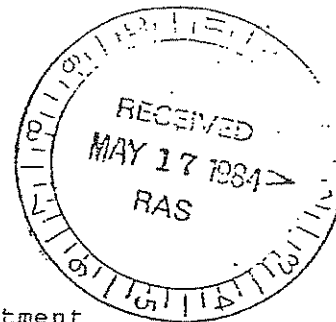


EXHIBIT 2



AMERICAN PETROLEUM INSTITUTE
Medicine and Biological Science Department
Toxicology Committee
Minutes of Meeting

Hanalei Hotel
San Diego, California

Wednesday, January 11, 1984
9:00 a.m.

ATTENDANCE:

J. A. MacGregor, Ph.D. - Chairman
P. H. Craig, V.M.D. - Vice Chairman

Committee Members Present

W.D. Broddle
C.C. Conaway
C.R. Clark
R.M. Coomes
P.J. Garvin
C.A. Halder
R.A. Kunā
M.L. Lakin
S.C. Lewis

R.W. Mast
A.E. Mekitarian
R.N. Roth
C.A. Schreiner
M.B. Slomka
F.B. Thomas
W.C. Thomas
C.O. Ward

Others Present

S.C. Blum
L. Golberg

H.N. MacFarland
S.S. Sternberg

Staff Present

C. Blank
S.T. Cragg

K.A. Hazer
C.E. Holdsworth

I. OPENING REMARKS

Chairman J.A. MacGregor opened the meeting by welcoming those present, including the SPAR consultants, Drs. Leon Golberg and Steven Sternberg. She advised that annual project proposal sheets for 1985 would be sent soon from staff and that the members should give careful consideration to prioritizing the projects. In order that the

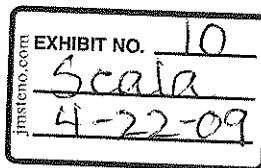
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process run smoothly, Dr. MacGregor further recommended that each company's HESC representative be closely involved or at least advised of their company's prioritization. This would help insure the successful implementation of the 1985 toxicology program.

In order to help the members prioritize the 1985 projects, HESC wants a balance of 3 areas of testing. These include; 1) issues (e.g., gasoline, benzene); 2) methods development; and; 3) basic information. Dr. Holdsworth added that it is not too late to submit research proposals for consideration in the 1985 budget.

The Toxicology budget is \$1.8 million for 1984 and the task forces are urged to move their projects along now in order to avoid a year-end rush to commit budgets. All but a small fraction of the 1983 budget of \$2.4 million was committed last year. This included PS-8 money which HESC would not allow expended while they were reviewing proposed studies under this project. This and synfuels money was therefore allowed to be carried-over.

II. SPECIAL REPORTS

A. Coordinating Committee on Gasoline (CCG)

Dr. Slomka reported that the OH-39 task force had visited Dr. Curtis Wilson of Scripps Institute just a few days previously. This investigator will help the task force evaluate a population of gasoline abusers for immunological effects.

On behalf of the CCG, Dr. Slomka requested information updates from all toxicology task forces on gasoline. There is a trend toward more coordinating committees and Dr. Slomka recommended that more technically oriented individuals be appointed to them in the future.

Discussion turned to recently completed and ongoing toxicological research with gasoline. The proceedings of the Boston nephropathy workshop have been published by API and will be peer-reviewed for subsequent publication in hardbound copy in the Advances in Toxicology. The UAREP report is nearing finalization and should be available soon.

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It was decided that interim reports will be obtained from the contractor regarding the PS-53 "time-course" gavage study. The final report is expected midyear.

B. Benzene

P.J. Garvin reported on the status of talks between the union and industry on a benzene standard. This activity is being sponsored by OSHA which is scheduled to issue the standard in June of this year. Mr. Garvin said that, thus far, talks have focused on ancillary issue, steering away from a PEL.

Regarding EPA activities, the proposed benzene standard for maleic anhydride plants has been withdrawn under stationary sources regulation. However a standard is expected for coke plants and a NESHAP for refineries will be forthcoming. Mobil sources may be regulated in the future.

A CMA sponsored epidemiology study has recently been completed, C.O. Ward reported. The results are equivocal and depend upon which control group is used for comparison. A cohort of concurrent controls was very healthy with no incidence of leukemia, far below the national average. Comparison to this group showed an excessive rate of leukemia in the exposed workers, which when compared to the national average appeared conversely, to have normal incidence rates of this disease. Curiously, no cases of acute myelogenous leukemia occurred in the exposed workers.

C. Asphalt

F.B. Thomas related that IARC would complete its review of asphalt (bitumens) by the end of February. API has been invited to send one participant in the review proceedings (not yet chosen). Barry Simpson of Shell International will participate on behalf of CONCAWE while Ted Chipperfield, consultant retiree from IP will provide chemistry expertise to the IARC review panel.

The asphalt consortium of trade associations is reviewing a finalized draft of 2 monographs dealing with asphalt (one on chemistry and another on biological effects). Further revisions will be sought, Dr. Thomas added.

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The consortium is also conducting a feasibility evaluation for a possible epidemiology study, W.D. Broddle said. A Dr. Chaizze of Georgetown University has been contracted to perform the feasibility analysis. Dr. Broddle also updated the committee on the status of the NIOSH sponsored skin-painting studies which are to be conducted at A.D. Little.

Regarding the A.D. Little study, samples are now being prepared and the protocol generated. The study will encompass 50 groups exposed to variously generated asphalt and subfractions thereof. Chemical analysis may be done directly by NIOSH. NIOSH will sponsor a symposium, Dr. Broddle continued, which is intended to generate guidelines for biological monitoring. It can be concluded from all this NIOSH activity that asphalt is of high concern. Furthermore, substantial litigation against the industry is occurring where workers are claiming to have suffered health effects from asphalt exposure.

D. Hydrocarbons (Gasoline) in Groundwater

Dr. F.B. Thomas related that MBSD had initially requested assistance in identifying which chemicals might be present (and in what concentrations) in groundwater contaminated by gasoline and other hydrocarbons. From this request, a multidisciplinary group was formed under EAD which is evaluating the solubilities at different temperatures of those chemicals likely to be present. Company records reveal that benzene, toluene, xylenes, methyl tertiary-butyl ether, tertiary-butyl alcohol and ethyltoluene are present at concentrations and in proportions which depend upon their water solubility, the distance from the contamination and a variety of other factors. Dr. Thomas added that MBSD is currently acting in an advisory capacity but may become more active later if testing is needed. TRC has been contracted to conduct a literature survey on the potential health effects of contaminated groundwater and may perform experiments to model the plume of a gasoline spill. Aside from the obvious question of oral ingestion of contaminated water, Dr. Thomas noted that some of the issues which are being evaluated include: 1) whether food can be washed with contaminated water; 2) whether such water can be used for bathing and; 3) whether boiling increases or reduces contaminant concentrations. Dr. MacGregor added that it is most important that the interdisciplinary

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group not fall behind schedule in light of the importance of the contaminated water issue and because possible future MBSD health related research hinges upon the conclusion reached by the group.

Dr. MacGregor said that the Toxicology Committee should be ready when this group defines what to test by having tox studies identified and protocols generated by the time samples become available. Dr. Thomas will poll Toxicology Subcommittee chairs to compile a list of needed studies.

E. TSCA Section 4 Activities

API has formed a group in response to EPA's new program: Leaking Underground Storage Tanks (LUST), which is attempting to evaluate the extent of underground storage tank leaks and associated problems, R.N. Roth reported. EPA is presently evaluating the ability of the industry to comply with a range of standards which it is considering.

Finalized GLP's have been issued by EPA in Vol. 48, page 53946 of the Federal Register, Dr. MacGregor noted. It is possible to submit comments on these standards annually. B.K. Hoover (API/MBSD staff) is coordinating the first round of responses for the industry and those interested should submit their comments to her. Dr. MacGregor said that the new guidelines call for detailed chemical analysis of test samples even for acute tests. Even while responding to some of the items which appear unreasonable, it was agreed that API would try to comply with the new guidelines in future toxicity testing. In a related area, several members noted that their studies had been audited by EPA, either in their own laboratories or in a contractor's. EPA seems to be stepping up its activities in this area and has become more sophisticated in the auditing process.

The Interagency Testing Committee (ITC) recently issued a list of 82 chemicals and API/HSRD will supply comment. Oleolamine is on the list and is of interest to the industry because of its presence in lube oils. Drs. Craig and Daikin recently made a presentation to the ITC to argue against testing individual components of complex mixtures in order to predict the toxicity of the whole. The presentation seemed to be well received.

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Dr. Roth related that API/ HSRD has made comment to EPA's proposed test rule on ethyltoluene (ET) and trimethylbenzene (TMB). API has argued that EPA should not hold the petroleum industry liable for testing these compounds on the basis that they occur to a few percent in gasoline (and because great quantities of gasoline are sold, the petroleum industry thus indirectly becomes the largest producer of these chemicals). API has also argued (similar to the ITC presentation), that individual tox testing results from these two compounds will not be useful in predicting the toxicity of gasoline which is comprised of at least 300 chemicals. It is estimated that perhaps one year may pass before EPA makes a decision on this issue. Therefore, the Toxicology Committee may not be asked to perform studies for this length of time (or ever) on ET, TMB or even a C-9 cut which EPA might be willing to substitute as more representative of gasoline. Specifically regarding C-9 cuts, the Interagency Testing Committee has recommended to EPA that additional toxicology information is needed. M.B. Slomka indicated that cuts with high levels of C-9 aromatic compounds have long been used in great quantity as vehicles for pesticides.

EPA has also become interested in cresols, Dr. R.W. Mast related. Because cresols occur in gasoline, another test rule may be issued affecting the petroleum industry on the same basis as that for ET and TMB. Dr. Mast noted that an interindustry "Cresols" task force exists which was negotiating with EPA on a voluntary testing program. Negotiations have broken down although some of the task force members are still trying to obtain funding. Dr. Broddle added that several genetic tox studies have been completed on an equal mixture of o, m and p-cresols, some of which were positive.

F. Methyl tertiary-Butyl Ether

Dr. Conaway provided a written summary of this project as well as an oral presentation (Attachment I). The participants in these studies are considering whether to perform pharmacokinetic studies with remaining funds of \$28,000. Dr. Curtis Klaassen and an investigator at Naylor-Dana Institute are being considered for these studies. Dr. Golberg mentioned that Dr. Caldwell of St. Mary's Hospital in London is also highly qualified to perform such research.

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